SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	R-1233zd (E)
Product Use Description	:	Refrigerant, Power cycle fluid, Heat transfer fluid
Manufacturer or supplier's details	:	Continental FluoroChem, Inc. 244 Fifth Avenue, 2nd Floor New York, New York 10001
For more information call	:	800-353-0877 (Monday-Friday, 9:00am-5:00pm)
In case of emergency call	:	**(CHEMTREC): 1-800-424-9300** (24 hours/day, 7 days/week)

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Form	:	liquid, clear
Color	:	colourless
Odor	:	slight

Classification of the substance or mixture

Classification of the substance or mixture	:	Gases under pressure, Liquefied gas Simple Asphyxiant

GHS Label elements, including precautionary statements

Symbol(s) :

Signal word : Warning

Hazard statements : Contains gas under pressure; may explode if heated.
May displace oxygen and cause rapid suffocation.

Precautionary statements : **Prevention:**
Use personal protective equipment as required.

Storage:
Protect from sunlight. Store in a well-ventilated place.

Carcinogenicity

No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP, IARC, or OSHA.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical nature : Substance

Chemical Name	CAS-No.	Concentration
trans-1-Chloro-3,3,3-trifluoropropene	102687-65-0	>99.00 %

SECTION 4. FIRST AID MEASURES

Inhalation : Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Use oxygen as required, provided a qualified operator is present. Call a physician.

Skin contact : After contact with skin, wash immediately with plenty of water. If symptoms persist, call a physician. Take off all contaminated clothing immediately. Wash contaminated clothing before re-use.

Eye contact	:	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Call a physician if irritation develops or persists.
Ingestion	:	If victim is fully conscious, give a cupful of water. Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Call a physician immediately.

Notes to physician

Treatment	:	Treat symptomatically.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media	:	The product is not flammable. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Water spray Carbon dioxide (CO2) Dry chemical Foam
Specific hazards during firefighting	:	This product is not flammable at ambient temperatures and atmospheric pressure. However, this material can ignite when mixed with air under pressure and exposed to strong ignition sources. Container may rupture on heating. Cool closed containers exposed to fire with water spray. Do not allow run-off from fire fighting to enter drains or water courses. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Exposure to decomposition products may be a hazard to health. In case of fire hazardous decomposition products may be produced such as: Hydrogen fluoride Gaseous hydrogen chloride (HCl). Carbon monoxide Carbon dioxide (CO2) Carbonyl halides

Special protective equipment for firefighters	:	In the event of fire and/or explosion do not breathe fumes. Wear self-contained breathing apparatus and protective suit. No unprotected exposed skin areas.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions	:	Immediately evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Wear personal protective equipment. Unprotected persons must be kept away. Remove all sources of ignition. Ventilate the area. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Avoid accumulation of vapours in low areas. Unprotected personnel should not return until air has been tested and determined safe. Ensure that the oxygen content is >= 19.5%.
Environmental precautions	:	Do not flush into surface water or sanitary sewer system. Prevent further leakage or spillage if safe to do so. Prevent spreading over a wide area (e.g. by containment or oil barriers).
Methods for cleaning up	:	Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

SECTION 7. HANDLING AND STORAGE

Handling

Handling	:	Handle with care. Do not use in areas without adequate ventilation. Do not breathe vapours or spray mist. Avoid contact with skin, eyes and clothing. Follow all standard safety precautions for handling and use of compressed gas cylinders.

Use authorized cylinders only.
Protect cylinders from physical damage.
Do not puncture or drop cylinders, expose them to open flame or excessive heat.
Do not pierce or burn, even after use. Do not spray on a naked flame or any incandescent material.
Do not remove screw cap until immediately ready for use.
Always replace cap after use.

Advice on protection against fire and explosion : Can form a combustible mixture with air at pressures above atmospheric pressure.
Keep product and empty container away from heat and sources of ignition.

Storage

Requirements for storage areas and containers : Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 55 °C.
Keep containers tightly closed in a dry, cool and well-ventilated place.
Storage rooms must be properly ventilated.
Ensure adequate ventilation, especially in confined areas.
Protect cylinders from physical damage.
Store away from incompatible substances.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Protective measures : Ensure that eyewash stations and safety showers are close to the workstation location.
Do not breathe vapours or spray mist.
Avoid contact with skin, eyes and clothing.

Engineering measures : Use with local exhaust ventilation.
Perform filling operations only at stations with exhaust ventilation facilities.

Eye protection : Do not wear contact lenses.
Wear as appropriate:
Goggles or face shield, giving complete protection to eyes

Hand protection : Impervious gloves
Gloves must be inspected prior to use.

Replace when worn.

Skin and body protection : Wear as appropriate:
Solvent-resistant gloves
Solvent-resistant apron and boots
If splashes are likely to occur, wear:
Protective suit

Respiratory protection : In case of insufficient ventilation wear suitable respiratory equipment.
Wear a positive-pressure supplied-air respirator.
For rescue and maintenance work in storage tanks use self-contained breathing apparatus.
Use NIOSH approved respiratory protection.

Hygiene measures : Handle in accordance with good industrial hygiene and safety practice.
Avoid contact with skin, eyes and clothing.
Do not breathe vapours or spray mist.
Ensure adequate ventilation, especially in confined areas.
Remove and wash contaminated clothing before re-use.
Contaminated work clothing should not be allowed out of the workplace.
Keep working clothes separately.
Wash hands before breaks and immediately after handling the product.

Exposure Guidelines

Components	CAS-No.	Value	Control parameters	Update	Basis
trans-1-Chloro-3,3,3-trifluoropropene	102687-65-0	TWA : time weighted average	(800 ppm)	2013	WEEL:OARS - Workplace Environmental Exposure Level (WEEL) Guides

trans-1-Chloro-3,3,3-trifluoropropene	102687-65-0	TWA : time weighted average	(800 ppm)	2013	

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state	:	liquid, clear
Color	:	colourless
Odor	:	slight
Melting point/freezing point	:	< -90 °C Method: OECD Test Guideline 102
Boiling point/boiling range	:	19 °C
Flash point	:	Method: ISO 2719 Note: not applicable
Flammability	:	The product is not flammable. Method: Flammability (gases)
Lower explosion limit	:	Note: None
Upper explosion limit	:	Note: None
Vapor pressure	:	1,516 hPa at 30 °C(86 °F)
Vapor density	:	Note: (Air = 1.0), not determined
Density	:	1.27 g/cm3
Water solubility	:	1.90 g/l at 20 °C Method: OECD Test Guideline 105

Partition coefficient: n-octanol/water	:	log Pow: 2.2 at 25 °C
Ignition temperature	:	380 °C at 986.8 - 1,035.9 hPa Method: DIN 51794
Oxidizing properties	:	The substance or mixture is not classified as oxidizing.
Molecular weight	:	130.5 g/mol

SECTION 10. STABILITY AND REACTIVITY

Chemical stability	:	Stable under recommended storage conditions.
Possibility of hazardous reactions	:	Polymerization can occur.
Conditions to avoid	:	Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 55 °C. Can form a combustible mixture with air at pressures above atmospheric pressure. Do not mix with oxygen or air above atmospheric pressure.
Incompatible materials to avoid	:	Strong oxidizing agents Finely divided magnesium Finely divided aluminium
Hazardous decomposition products	:	In case of fire hazardous decomposition products may be produced such as: Carbon monoxide Carbon dioxide (CO2) Carbonyl halides Gaseous hydrogen chloride (HCl). Gaseous hydrogen fluoride (HF).

SECTION 11. TOXICOLOGICAL INFORMATION

Acute inhalation toxicity	:	LC50: 120000 ppm

Exposure time: 4 h
Species: rat

Skin irritation : Species: rabbit
Result: No skin irritation
Classification: Not classified as a skin irritant in animal testing.
Method: OECD Test Guideline 404
Exposure time: 4 h

Sensitisation : Result: Does not cause skin sensitisation.
Classification: Patch test on human volunteers did not demonstrate sensitisation properties.

: Cardiac sensitization
Species: dogs
Note: Cardiac sensitisation threshold (dog): 25000 ppm.

Repeated dose toxicity : Species: rat
Application Route: Inhalation
Exposure time: 4 Weeks
NOEL: 4500 ppm
Note: Subacute toxicity

Genotoxicity in vitro : Test Method: Mutagenicity (Salmonella typhimurium - reverse mutation assay)
Result: negative

Genotoxicity in vivo : Species: rat
Cell type: Bone marrow
Method: Mutagenicity (micronucleus test)
Result: negative

Genotoxicity in vivo : Test Method: Unscheduled DNA synthesis
Species: rat
Result: negative

Genotoxicity in vivo : Species: mouse
Cell type: Bone marrow
Method: Mutagenicity (micronucleus test)
Result: negative

Reproductive toxicity	:	Species: rabbit Note: No-observed-effect level - 15,000 ppm
	:	Species: rat Note: No-observed-effect level - 10,000 ppm
Teratogenicity	:	Species: rabbit Note: No-observed-effect level - 15,000 ppm
	:	Species: rat Note: No-observed-effect level - 10,000 ppm
Further information	:	Note: Excessive exposure may cause central nervous system effects including drowsiness and dizziness. Excessive exposure may also cause cardiac arrhythmia.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity effects

Toxicity to fish	:	LC50: 38 mg/l Exposure time: 96 h Species: Oncorhynchus mykiss (rainbow trout) Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	:	Immobilization EC50: 82 mg/l Exposure time: 48 h Species: Daphnia magna (Water flea) Method: OECD Test Guideline 202
Toxicity to algae	:	Growth inhibition EC50: 106.7 mg/l Exposure time: 72 h Species: Pseudokirchneriella subcapitata (green algae) Method: OECD Test Guideline 201

: Growth rate
NOEC: 115 mg/l
Exposure time: 72 h
Species: Pseudokirchneriella subcapitata (green algae)
Method: OECD Test Guideline 201

Elimination information (persistence and degradability)

Biodegradability : Result: Not readily biodegradable.
Value: 0 %
Method: OECD 301 D

Further information on ecology

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods : Observe all Federal, State, and Local Environmental regulations.

Note : Where possible recycling is preferred to disposal or incineration.

SECTION 14. TRANSPORT INFORMATION

DOT	UN/ID No.	:	UN 3163
	Proper shipping name	:	LIQUEFIED GAS, N.O.S. (Trans-1-Chloro-3,3,3-trifluoropropene)
	Class		2.2
	Packing group		
	Hazard Labels		2.2
IATA	UN/ID No.	:	UN 3163
	Description of the goods	:	LIQUEFIED GAS, N.O.S. (Trans-1-Chloro-3,3,3-trifluoropropene)
	Class	:	2.2
	Hazard Labels	:	2.2
	Packing instruction (cargo aircraft)	:	200

	Packing instruction (passenger aircraft)	:	200
IMDG	UN/ID No.	:	UN 3163
	Description of the goods	:	LIQUEFIED GAS, N.O.S. (TRANS-1-CHLORO-3,3,3-TRIFLUOROPROPENE)
	Class	:	2.2
	Hazard Labels	:	2.2
	EmS Number	:	F-C, S-V
	Marine pollutant	:	no

SECTION 15. REGULATORY INFORMATION

Inventories

US. Toxic Substances Control Act	:	On TSCA Inventory
Australia. Industrial Chemical (Notification and Assessment) Act	:	On the inventory, or in compliance with the inventory
Canada. Canadian Environmental Protection Act (CEPA). Domestic Substances List (DSL)	:	All components of this product are on the Canadian DSL.
Japan. Kashin-Hou Law List	:	On the inventory, or in compliance with the inventory
Korea. Toxic Chemical Control Law (TCCL) List	:	On the inventory, or in compliance with the inventory
Philippines. The Toxic Substances and Hazardous and Nuclear Waste Control Act	:	Not in compliance with the inventory
	:	trans-1-Chloro-3,3,3-trifluoropropene 102687-65-0
China. Inventory of Existing Chemical Substances	:	On the inventory, or in compliance with the inventory

New Zealand. Inventory of Chemicals (NZIoC), as published by ERMA New Zealand	:	Not in compliance with the inventory	
	:	trans-1-Chloro-3,3,3-trifluoropropene	102687-65-0

National regulatory information

SARA 302 Components	:	SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.
SARA 313 Components	:	SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.
SARA 311/312 Hazards	:	Acute Health Hazard Sudden Release of Pressure Hazard
California Prop. 65	:	This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

New Jersey RTK	:	trans-1-Chloro-3,3,3-trifluoropropene	102687-65-0
Pennsylvania RTK	:	trans-1-Chloro-3,3,3-trifluoropropene	102687-65-0
WHMIS Classification	:	A: Compressed Gas This product has been classified according to the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR.	

SECTION 16. OTHER INFORMATION

		HMIS III	NFPA
Health hazard	:	2	2
Flammability	:	0	0
Physical Hazard	:	0	
Instability	:		0

Hazard rating and rating systems (e.g. HMIS® III, NFPA): This information is intended solely for the use of individuals trained in the particular system.

Further information

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text. Final determination of suitability of any material is the sole responsibility of the user. This information should not constitute a guarantee for any specific product properties.